

**REMARKS**

Pursuant to the present amendment, claims 1-17 have been canceled and new claims 77-87 have been added. Thus, claims 18-42 and 77-87 are pending in the present application. No new matter has been introduced by way of the present amendment. Reconsideration of the present application is respectfully requested.

In the Office Action, the Examiner objected to the Abstract on the basis that it was believed to contain too many words. Submitted herewith is a revised Abstract that is believed to overcome the objection issued by the Examiner. Withdrawal of the objection to the Abstract and acceptance of the new Abstract is respectfully submitted.

The Examiner also objected to the specification for allegedly failing to provide a proper antecedent basis for the dopant concentration limitations set forth in claim 11. Pursuant to the present amendment, claim 11 has been canceled thereby rendering the Examiner's objection moot. However, the Examiner's statement that "only  $10^{18}$  is disclosed" is believed to be in error. Specifically, in the specification at page 11, line 19 – page 12, line 1, the concentration is disclosed as ranging from  $10^{16}$  –  $10^{18}$ .

In the Office Action, claims 1, 3, 10, 11, 15 and 17 were rejected under 35 U.S.C. § 102 as allegedly being anticipated by Yamaguchi (U.S. Patent No. 5,926,703). Claims 1, 2, 4-14, 16 and 18-42 were rejected under 35 U.S.C. § 103 as allegedly being unpatentable over Yu (U.S. Patent No. 6,221,724) in view of Yamaguchi. Applicants respectfully traverse the Examiner's rejections.

As an initial matter, pursuant to the present amendment, claims 1-17 have been canceled. Thus, the Examiner's anticipation rejections based upon Yamaguchi are believed to be moot.

As the Examiner well knows, to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991); M.P.E.P. § 2142. Moreover, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (CCPA 1974). If an independent claim is nonobvious under 35 U.S.C. § 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988); M.P.E.P. § 2143.03.

With respect to alleged obviousness, there must be something in the prior art as a whole to suggest the desirability, and thus the obviousness, of making the combination. *Panduit Corp. v. Dennison Mfg. Co.*, 810 F.2d 1561 (Fed. Cir. 1986). In fact, the absence of a suggestion to combine is dispositive in an obviousness determination. *Gambro Lundia AB v. Baxter Healthcare Corp.*, 110 F.3d 1573 (Fed. Cir. 1997). The mere fact that the prior art can be combined or modified does not make the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 U.S.P.Q.2d 1430 (Fed. Cir. 1990); M.P.E.P. § 2143.01. The consistent criterion for determining obviousness is whether the prior art would have suggested to one of ordinary skill in the art that the process should be carried out and would have a reasonable likelihood of success, viewed in the light of the prior art. Both the suggestion and the expectation of success must be founded in the prior art, not in the Applicant's

disclosure. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991); *In re O'Farrell*, 853 F.2d 894 (Fed. Cir. 1988); M.P.E.P. § 2142.

Three independent claims are pending in the present application, *i.e.*, claims 18, 31 and 77. All of these claims require, among other things, first, second and third doped regions formed in the bulk substrate, the first, second and third doped regions being comprised of a dopant material that is the same type as the bulk substrate dopant material, the first, second and third doped regions having a greater concentration level of dopant material than the first concentration level, the first doped region being substantially aligned with the gate electrode and vertically spaced apart from the second and third doped regions. Of course, each of the independent inventions must be analyzed based upon the invention as a whole including other limitations set forth in the various independent claims. Nevertheless, it is respectfully submitted that the prior art cited by the Examiner does not render the inventions defined by these independent claims obvious.

The Examiner rejected claims 18-42 based upon Yu in view of Yamaguchi. It is respectfully submitted that this rejection is improper. As an initial matter, in paragraph 14 of the Office Action, the Examiner stated that Yu disclosed a first doped region 36 formed in the bulk substrate wherein the first doped region 36 is comprised of a dopant material that is the same type as the substrate dopant material. In paragraph 15 of the Office Action, the Examiner stated that Yu disclosed second and third doped regions 40, 42 formed in the substrate wherein the second and third doped regions 40, 42 were comprised of a dopant material that is the same type as the bulk substrate dopant material. Applicants respectfully disagree with the Examiner's reading of Yu. More specifically, Yu states that the substrate 12 is lightly doped to form well region 28, the dopants having the opposite type (P-type or N-type) of the substrate 12. Col. 4, ll.

42-44. Thus, it is clear that the well region 28 is doped with either a P-type or N-type dopant material. Thereafter, as indicated by the arrows 46, inert ions, *e.g.*, nitrogen, oxygen or xenon ions, are implanted through the gate stack 20 into the substrate. According to Yu, the implant material may be any material which will not become electrically activated during a subsequent thermal annealing step due to the material having a large activation energy. Col. 4, ll. 53-64; Col. 5, ll. 5-14. Thus, it is clear that Yu discusses the implantation of inert ions into the well region 28 that is doped with P-type or N-type dopants depending upon the particular application. In view of the foregoing, it is respectfully submitted that the Examiner's assertion that the various doped regions are doped with a dopant material that is the same type as the substrate is in error.

In accordance with various aspects of the present invention, if the bulk substrate is doped with an N-type dopant material, then the first, second and third doped regions are also doped with an N-type dopant material. Similarly, if the bulk substrate is doped with a P-type dopant material, then the first, second and third doped regions are also doped with a P-type dopant material. It is clear that such a methodology is not contemplated nor disclosed in Yu. In fact, it is believed that Yu teaches away from such a device and method of making such a device. Yu notes that the gate stack 20 may be doped with boron, *i.e.*, a P-type dopant material. According to Yu, the boron dopant, however, tends to diffuse through the insulating layer or portion 24 during subsequent thermal annealing. To counter this effect, Yu suggests that it was discovered that the inert ion implantation step left a reasonable amount of material, *e.g.*, nitrogen ions, near the top surface 38 of the substrate 12. According to Yu, this amount of material, while not interfering substantially with the electrical properties of the channel region 30, suppresses the gate boron diffusion through the insulating portion 24. Accordingly, process variations can be

reduced. Col. 5, ll. 16-28. Based upon this disclosure of Yu, it is respectfully submitted that Yu does not disclose or suggest implanting a P-type dopant material into a P-type bulk substrate, as one of the stated purposes of Yu is to prevent the diffusion of boron dopant material in the gate stack 20 into the channel region of the device.

In paragraph 16 of the Office Action, the Examiner identified several limitations of claims 18-42 that were not disclosed or suggested in Yu. In addition to these admitted missing limitations, as shown above, the Examiner's contention regarding the disclosure of Yu as it relates to the various doped regions, as set forth in paragraphs 14-15 of the Office Action, was, respectfully, in error.

Having shown that Yu, the Examiner's primary reference in rejecting claims 18-42, lacks many of the fundamental limitations set forth in the pending claims, it is respectfully submitted that the citation to Yamaguchi cannot cure the fundamental deficiencies in the primary reference Yu. Simply put, there is no suggestion in Yamaguchi or Yu to combine the references in a manner so as to arrive at Applicants' claimed invention.


First, even in Yamaguchi and Yu are combined as suggested by the Examiner, such a combination of prior art does not teach each and every limitation of the claimed invention. Thus, any obviousness rejection based upon such art is legally improper. Moreover, there is no suggestion in Yamaguchi or Yu to modify the teachings of those references so as to arrive at Applicants' claimed invention. Yu is quite express in its disclosure that the doped regions are formed by implanting inert ions that are not intended to become electrically activated during a subsequent thermal anneal process. If anything, Yu can be said to teach away from the present invention in that it specifically states that, by implanting the inert ions disclosed therein, boron diffusion from the gate stack 20 may be reduced or eliminated. See, *e.g.*, Yu, Col. 5, ll. 16-28. It

is respectfully submitted that any attempt to assert that the inventions defined by the pending claims are obvious in view of Yu and Yamaguchi is necessarily based upon an improper use of hindsight using Applicants' disclosure as a roadmap. A recent Federal Circuit case makes it crystal clear that, in an obviousness situation, the prior art must disclose each and every element of the claimed invention, and that any motivation to combine or modify the prior art must be based upon a suggestion in the prior art. *In re Lee*, 61 U.S.P.Q.2d 143 (Fed. Cir. 2002). Conclusory statements regarding common knowledge and common sense are insufficient to support a finding of obviousness. *Id.* at 1434-35.

In view of the foregoing, it is respectfully submitted that all pending claims are in condition for immediate allowance. The Examiner is invited to contact the undersigned attorney at (713) 934-4055 with any questions, comments or suggestions relating to the referenced patent application.

Respectfully submitted,

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Date: September 17, 2004

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